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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/450,381	11/29/1999	RAJESH R. SHAH	219.37639X00	7550

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EXAMINER
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ART UNIT	PAPER NUMBER
2126	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/450,381	SHAH ET AL.
	Examiner	Art Unit
	Charles E Anya	2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3/* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2003* .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 – 3,7,14,15,18,20,28 and 30 are rejected under 35 U.S.C. 102(e) as

being anticipated by U.S. Pat. No. 6,151,684 to Alexander et al.

As to claim 1, Alexander teaches a Host (Nodes 12 Col. 5 Ln. 54 – 67, Col. 6 Ln.

1 – 17), a Cluster Fabric (Cluster 10, "numeral 11..." Col. 5 Ln. 45 – 67, Col. 6 Ln. 1 –

28), a Fabric-Attached I/O Controller (SCSI Controllers 22, I/O Controllers 28 Col. 5 Ln.

54 – 67 "...device..." Col. 8 Ln. 32 – 44), a Processor (CPU 36 Col. 5 Ln. 65 – 67), a

Memory (Memory 38 Col. 5 Ln. 65 – 67), an Operating System ("TNC-enhanced

operating system" Col. 6 Ln. 6 – 28, UNIX operating system Col. 7 Ln. 57 – 67, Col. 8

Ln. 1 – 67), a I/O Bus Abstraction ("vproc layer..." Col. 6 Ln. 35 – 45, "mechanism..."

Col. 8 Ln. 35 – 44, Col. 9 Ln. 5 – 14, "cspecfs mechanisms..." Col. 10 Ln. 28 – 45) and

a Target Fabric-Attached I/O Controller (SCSI Controllers 22, I/O Controllers 28 Col. 5

Ln. 54 – 67 "...device..." Col. 8 Ln. 32 – 44).

As to claim 2, Alexander teaches a Kernel ("base kernel code..." Col. 6 Ln. 35 –

45) and I/O Abstraction (Col. 6 Ln. 35 – 45).

As to claim 3, Alexander teaches the presenting of the cluster fabric as a local

I/O Bus and one or more target fabric-attached I/O controllers as local I/O controllers

("...transparency..." Col. 6 Ln. 6 – 46).

As to claim 7, Alexander teaches utilizing the multiple paths for load balancing

I/O requests and/or for fault tolerance ("...node failure..." Col. 8 Ln. 31 – 44).

As to claim 14, claim 1 covers claim 14 except for a fabric manager.

Alexander teaches a Fabric Manager ("e.g. node 12..." Col. 11 Ln. 17 – 45).

As to claim 15, see the rejection of claim 2.

As to claims 18, 28 and 30 see the rejection of claim 7.

As to claim 20, Alexander teaches a fabric services that detects connection

("identifies the ownership..." Col. 11 Ln. 17 – 25), the step of assigning a network

address (Col. 12 Ln. 62 – 67, Col. 13 Ln. 1 – 5: NOTE: The "handle" could be a network

address that uniquely identifies a particular I/O controller e.g. c0t4d0p0s3 Col. 11 Ln. 45

– 52. Also network addresses are inherently assigned whenever an I/O controller is

assigned because the network address is the only way of knowing where to locate the

I/O controller) and I/O Controller Manager (DOIS Server Code 66, DOIS Server DLM

code 68 Col. 12 Ln. 62 – 67, Col. 13 Ln. 1 – 67).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

Claims 4,5,9 – 13,16,21 – 23,25,26 and 29 are rejected under 35 U.S.C. 103(a)

as being unpatentable over U.S. Pat. No. 6,151,684 to Alexander et al. in U.S. Pat.

No. 6,470,397 B1 to Shah et al.

As to claim 4, Alexander is silent with reference to a Host-Fabric Adapter.

Shah teaches a Host-Fabric Adapter ("...host bus adapter..." Col. 5 Ln. 18 – 36). It

would have been obvious to apply the teaching of Shah to the system of Alexander.

One would have been motivated to make such a modification in order to transfer data to

and from the Fibre Channel Loop 100 (Col. 5 Ln. 27 – 30).

As to claim 5, Shah teaches a Fabric Adapter Device Driver ("...device drivers..."

Col. 5 Ln. 27 – 36).

As to claim 9, claim 1 covers claim 9 except for an I/O manager and one or more

I/O controller drivers.

Alexander teaches One or More I/O Controller Drivers ("...device driver..." Col. 9 Ln. 31

– 34).

Alexander does not teach an I/O manager.

Shah teaches an I/O Manager (I/O Manager Col. 1 Ln. 48 – 59). It would have been obvious to apply the teaching of Shah to the system of Alexander. One would have been motivated to make such a modification to provide communication between drivers and application program or kernel (Col. 1 Ln. 48 – 59).

As to claim 10, by providing the cluster fabric as local cluster fabric (see the rejection of claims 3) the fabric bus driver of the cluster fabric would also be provided as a local fabric bus driver.

As to claim 11, see the rejection of claim 3.

As to claim 12, see the rejection of claims 9 and 10.

As to claim 13, Alexander as modified is silent with respect to the local I/O bus drivers and the fabric bus driver communicating with the I/O Manager using common set of procedures. Being that I/O Manager handles communication between drivers using its procedures, it would be proper to say that communication between fabric bus driver and I/O bus drivers could be managed/handled by the I/O Manager using common set of procedures.

As to claim 16, see the rejection of claims 4 and 5.

As to claim 21, claims 1,4 and 5 covers claim 21.

As to claim 22, claims 1,9 and 21 covers claim 22 (NOTE: initialization (loading and enabling) steps are inherent in Alexander as modified because the listed operating system kernel, I/O Manager and drivers of claims 1,9 and 21 would have to be loaded and enabled during initialization or thereabout otherwise I/O request would not be possible).

As to claim 23, Alexander as modified teaches using a common set of procedures or commands to report identified local I/O controllers, bus and fabric-attached controllers ("...common interface..." Col. 8 Ln. 3 – 24).

As to claims 25 and 29, see the rejection of claim 22.

As to claim 26, claim 23 covers claim 26.

Claims 6,8,17,19 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,151,684 to Alexander et al. in view of U.S. Pat. No. 6,470,397 B1 to Shah et al. as applied to claim 5 above, and further in view of U.S. Pat. No. 6,434,656 B1 to Downer et al.

As to claim 6, Alexander as modified in claim 5 is silent with reference to creating a separate object for each port of the host-fabric adapter that can be used to communicate with the target fabric-attached I/O controller.

Downer teaches to creating a separate object for each port of the host-fabric adapter that can be used to communicate with the target fabric-attached I/O controller ("...autoconfiguration procedure..." Col. 6 Ln. 10 – 67). It would have been obvious to apply the teaching of Downer to the system of Alexander as modified. One would have been motivated to make such a modification in order to examine hardware address of each port for connections to the other devices and provide links between examined/probed deivces/objects (Col. 6 Ln. 35 – 44).

As to claim 8, Alexander as modified is silent with reference to the step of creating a single device object for the target fabric-attached I/O controller even if multiple port of the host-fabric adapter can be used for communication.

Downer teaches the step of creating a single device object for the target fabric-attached

I/O controller even if multiple port of the host-fabric adapter can be used for

communication ("...autoconfiguration procedure...If a device is found..." Col. 6 Ln. 10 –

67).

As to claims 17 and 27, see the rejection of claim 6.

As to claim 19, see the rejection of claim 8.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Pat. No. 6,151,684, to Alexander et al. in view of U.S. Pat. No. 6,470,397 B1 to Shah

et al. as applied to claim 22 above, and further in view of U.S. Pat. No. 6,148,349 to

Chow et al.

As to claim 24, claim 22 covers claim 24 except for creating one instance of an

I/O controller driver stack.

Alexander is silent with reference to creating one instance of an I/O controller driver

stack.

Chow teaches creating one instance of an I/O controller driver stack (Initialization

(cs_init) Col. 13 Ln. 54 – 61:NOTE: The allocation and initialization of all driver

structures includes Common high level driver 502, Driver Device Specific Portion 504,

fCI Low Level Driver 506,Hardware Interface Module (HIM) 508 and SlimHIM 509 and

since the call for allocation and initialization is a single call operation only one allocation

of the driver stack would be performed). It would have been obvious to apply the

teaching of Chow to the system of Alexander. One would have been motivated to make

such a modification to prepare a device for I/O requests (Col. 13 Ln. 54 – 61).

Response to Arguments

3.   Applicant's arguments filed March 24, 2003 have been fully considered but they are not persuasive (claims 1 – 3,7,14,15,18,20,24,28 and 30).

Applicant argues that the cited prior art (Alexander 6,151,684) fails to disclose or suggest the "ability of an operating system (OS) to create and report multiple paths to a target fabric-attached I/O controller via the cluster fabric" (RESPONSE page 7 lines 16 – 19). Firstly, claim 1 requires an operating system that is provided with an I/O abstraction for the cluster fabric to report multiple paths to a target fabric-attached I/O controller, this claimed limitation is different from Applicant's argued limitation. Alexander teaches the cluster 10 (cluster fabric) to include a TNC-enhanced operating system that allows a collection of processing units/nodes (Nodes 12) to be connected together via a communication interconnect to form the cluster (Col. 6 Ln. 6 – 12). Using "vproc layer TNC operating system is provided an abstraction layer that allows its "base kernel code to do operations on processes without knowing or caring where the process is executing" (Col. 6 Ln. 35 – 45) therefore providing device transparency (Col. 8 Ln. 24 – 29). This in effect provides the TNC operating system with an I/O abstraction for the cluster fabric. Fig 1 ("...as a result of architecture of the system shown in FIG. 1..." (Cluster 10)) provides a mechanism that allows alternate path to a device (fabric-attached I/O controller) that is connected to the fabric cluster (Col. 8 Ln. 30 – 44), thus allowing the fabric cluster (Cluster 10) to provide multiple paths to the fabric-attached I/O controller.

It is worth mentioning that all claimed elements are disclosed in the cited prior art (Alexander 6,151,684) contrary to Applicant's assertion.

As regards to claim 24, Applicant argues that Chow does not teach any of the claimed limitations. The Examiner applied the Chow reference only to show the disclosure of "creating one instance of an I/O controller driver stack". Firstly, the ION Physical disk driver subsystem 500 includes I/O controller drivers (Common high level driver 502, Driver Device Specific Portion 504, fCl Low Level Driver 506, Hardware Interface Module (HIM) 508 and SlimHIM 509) and as such provides I/O controller driver stack. During initialization all driver structures are allocated, meaning that memory is allocated for the drivers, which is what takes place during the creation of an instance of an I/O controller driver stack, thus the limitation as claimed is taught by Chow.

Applicant's arguments with respect to claims 4 – 6,8 – 13,16,17,19 – 23,25 – 27 and 29 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E Anya whose telephone number is (703) 305-3411. The examiner can normally be reached on M-F (8:30-5:30) First Friday off.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 305-

3900.

Charles E Anya
Examiner
Art Unit 2126